

**840-TP-001-006**

# **EDC DAAC M&O Equipment**

## **Technical Paper**

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# Abstract

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This document supplies a basic overview of the maintenance and operations office environment provided at the EDC DAAC.

***Keywords:*** EDC, M&O, Hardware, COTS, Software.

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# 1. Introduction

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## 1.1 Purpose

The purpose of this document is to present an overview description of the maintenance and operations HW used by the EDC DAAC staff to monitor, analyze, report, and manage the operational HW and SW. This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

Appendix A contains a description of DAAC supplied, non-ECS procured, HW that has been added to the ECS M&O network. This HW is not covered by this specification but is provided for reference purposes.

## 1.2 Organization

The remainder of the document is organized as follows:

- Section 2: Related Documents
- Section 3: EDC DAAC M&O Equipment Requirements
- Section 4: EDC DAAC M&O Equipment
- Section 5: EDC DAAC M&O Equipment Test Results
- Appendix A: Non-ECS Hardware
- Abbreviations and Acronyms

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## 2. Related Documentation

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### 2.1 Parent Documents

The parent documents are the documents from which this document's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
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### 2.2 Applicable Documents

Documents referenced in this document are listed below.

#### ***920-series General Documents***

920-TDE-005	EDC Cable Management Plan
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#### ***921-series General Documents***

921-TDE-002	EDC Hardware Network Diagram
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#### ***ECS CDRLs***

601-CD-001	Maintenance and Operations Management Plan for the ECS Project
607-CD-001	Maintenance and Operations Position Descriptions for the ECS Project
608-CD-001	ECS Operations Plan for Release B

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### 3. EDC DAAC M&O Equipment Requirements

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Section 4 describes the functions performed using the EDC DAAC M&O equipment. The following comprise the requirements for this equipment.

#### 3.1 General

EDCMO0100	Number of staff. The EDC DAAC M&O Equipment shall provide, at a minimum, the tools for the following numbers of DAAC staff: <ul style="list-style-type: none"><li>a. Management and Administration<sup>1</sup>: 2</li><li>b. Engineering<sup>2</sup>: 24</li><li>c. Operations<sup>3</sup>: 35</li></ul>
EDCMO0110	System administration. The capability to backup and restore files from each component shall be provided.
EDCMO0120	Status and performance reports. The EDC DAAC M&O Equipment shall provide the tools to review and analyze system status and performance reports.
EDCMO0130	Management and technical reports. The EDC DAAC M&O Equipment shall provide the tools to review and/or develop management and technical reports on ECS performance.
EDCMO0140	DAAC internal coordination. The EDC DAAC M&O Equipment shall provide the tools in support of coordination within the DAAC.
EDCMO0150	DAAC external coordination. The EDC DAAC M&O Equipment shall provide the tools in support of coordination with other organizations including, at a minimum, other DAACs, the SMC, and other ECS organizations.

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<sup>1</sup> Positions per DIDs 607 & 608: DAAC ECS Contract Manager, DAAC Administrative Assistant

<sup>2</sup> Positions per DIDs 607 & 608: DAAC System Engineer, DAAC SW Maintenance Engineer, DAAC System Test Engineer, DAAC Database Administrator, DAAC Resource Planner, DAAC CM Administrator, DAAC ILS Administrator, DAAC Science SW I&T Support Engineer, DAAC Science Coordinator

<sup>3</sup> Positions per DIDs 607 & 608: DAAC Maintenance Coordinator, DAAC User Services Representative, DAAC Science Data Specialist, DAAC Operations Supervisor, DAAC Production Planner, DAAC Production Monitor, DAAC Resource Manager, DAAC Archive Manager, DAAC Ingest/Distribution Technician, DAAC Computer Operator, DAAC System Administrator, DAAC Operations Readiness & Performance Assurance

EDCMO0160 ECS documentation. The EDC DAAC M&O Equipment shall provide the tools to access, create, and maintain ECS documentation.

### **3.2 Management and Administration**

EDCMO0200 Management planning resources. The EDC DAAC M&O Equipment shall provide tools to support planning, budgeting, accounting, resource management, scheduling and other contract management activities.

EDCMO0210 Management policies and procedures. The EDC DAAC M&O Equipment shall provide the tools to develop and maintain ECS, DAAC and/or building policies and procedures.

EDCMO0220 Management documents. The EDC DAAC M&O Equipment shall provide tools for production and maintenance of memos, reports, and expense reports.

### **3.3 Engineering**

EDCMO0300 Operations data. The EDC DAAC M&O Equipment shall provide the tools to allow for retrieval, storage, analysis, and distribution of operations data.

EDCMO0310 DAAC analysis software. The EDC DAAC M&O Equipment shall provide the tools to create and maintain DAAC-unique software.

### **3.4 Operations**

EDCMO0400 Operations policies and procedures. The EDC DAAC M&O Equipment shall provide the tools to develop and administer policies, directives, and guidance to implement both ECS and DAAC operations tasking, procedures, practices, and priorities.

## 4. EDC DAAC M&O Equipment

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The HW and SW provided for M&O personnel to use for data collection, reduction, analysis, reporting and internal and external coordination and communications (as distinct from performance of the ECS mission using the operational resources, e.g., Data Server Subsystem, Communications Subsystem, Systems Management Subsystem, etc.). These HW and SW resources allow the engineering personnel to perform the duties described in DID 601, *Maintenance and Operations Management Plan*, and DID 607, *ECS Maintenance and Operations Position Descriptions*. The approximate number of personnel at the DAAC is shown in DID 608, *ECS Operations Plan for Release B*.

Table 4-1 partitions these resources into three functional areas.

**Table 4-1. EDC M&O Equipment Component Descriptions**

Functional Area	Class/Type	Specifics
Management and Administration	PC	Personal computers
Engineering	X-Term	NCD HMX X-Terminals
	Printer	HP printers*
	PC	Personal computers
	Workstations	Sun workstations
	Servers	Sun servers*
	Storage	Sun disk arrays*
	Tape Drives	8 mm *
Operations	PC	Personal computers

### 4.1 EDC DAAC Functions

#### 4.1.1 Management and Administration

The Management and Administration (MA) elements allow the management and supervisory staff at the DAAC to effectively communicate with other members of the DAAC staff as well as with external parties. Primary tasks performed on these resources include:

- ECS performance analysis - review and analyze system status and performance reports;
- ECS performance reporting - review and/or development of management and technical reports on ECS performance;

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\* Also supports Management and Administration, and Operations

- DAAC Manager liaison - provide a point of contact to the DAAC Manager and staff on all ECS On-Site M&O organization activities;
- ECS M&O Office liaison - provide management liaison to ECS M&O Office staff including ECS staff at other DAACs, the SMC, the EOC, the SEO, the parent ECS M&O organization, and development and support organizations;
- ECS personnel supervision - manage ECS training, certification;
- ECS planning, budgeting, accounting, resource management, scheduling and subcontract management - provide financial management and reporting on the ECS On-Site M&O organization;
- ECS policies and priorities - ensure that ECS On-Site personnel are tasked in accordance with ECS policies and priorities as driven by DAAC needs; ensure that company, ECS, DAAC and/or building, procedures and policies;
- Administrative support - support planning, budgeting, accounting, resource management, scheduling and contract management activities;
- Secretarial support - provide typing, filing, expense reports, mail distribution, meeting scheduling, etc.

#### **4.1.2 Engineering**

The engineering staff at the DAAC provides the primary set of skills to monitor current performance, monitor and develop short and long term trending data, analyses and reports, and develop configuration changes/tunings. These tasks are required so that the operational resources provide reliable, high performance support to the DAAC's customers.

The primary tasks are performed in whole or in part by this staff are:

- ECS algorithm development support - provide support to scientists in the development of algorithms that are executed by the ECS system;
- ECS algorithm I&T support - provide support to scientists in the test and integration of updated and new algorithms that are executed by the ECS system;
- ECS configuration management - coordinate usage of approved configuration management (CM) procedures; ensure that changes to the hardware, software, and procedures are properly documented and coordinated; if requested by Customer, provide recording secretarial tasks for the Customer Configuration Change Board (CCB); generate CCB monthly reports; prepare agendas for CCB meetings;
- ECS database administration - maintain the data bases and structure of the integrated system at the DAAC; provide the operations interface to perform data base administration utilities such as data base backup and recovery, performance monitoring, and tuning; administer user access control and daily data base synchronization;

- ECS development organization liaison - provide feedback on the performance of installed systems; coordinate future installations; support development activities such as design and document reviews; coordinate trouble tickets (TTs) and Configuration Change Requests (CCRs);
- ECS hardware maintenance - support the ECS availability requirements by replacement of LRUs; act as coordination point with the various vendors at the DAAC including preventative maintenance support; support the isolation of equipment problems; report on maintenance activities to the ECS ILS function;
- ECS integrated logistics support - interface with ECS ILS function in coordination of delivery of COTS hardware or software; handle ECS center shipping and receiving; act as local ILS representative;
- ECS performance analysis - analyze soft and hard copy reports on system effectiveness, productivity, capacity, and performance for ECS hardware and software resources and processes; monitor performance for trends and prepare reports on analyses;
- ECS planned upgrades - support and participate in planning and implementation of upgrades to the ECS;
- ECS property management - provide control of Government property; provide continuous audit trail from receipt of ECS procured or developed items until transfer of accountability;
- ECS quality assurance - perform Quality Assurance (QA) audits on a periodic basis to ensure adherence to established standards and procedures for hardware, software and operations; produce audit;
- ECS resource control - maintain and modify hardware and software system configurations, perform COTS administration (including operating system administration); support property management; support system anomaly tracking and analysis;
- ECS software maintenance - produce, deliver, and document corrections, modifications, and enhancements made to ECS software (including COTS), and/or adapt or incorporate COTS software for ECS use;
- ECS sustaining engineering - analyze and identify ways to accommodate needed improvements, new technologies and new concepts; manage system upgrades and evolution; control and maintain ECS updates; perform the activities necessary to assure ECS reliability, maintainability, and availability; support/provide evaluation of user inputs and monitor system performance to tune the system for optimum response and support; support operational readiness and performance assurance;
- ECS test and integration - feature test (i.e., ensure a new requirement and/or design is properly implemented) and regression test (i.e., ensure that previously provided capabilities continue to be properly provided) all system upgrades in DAAC

environment; maintain and update test procedures and data bases; provide test statistics, analyses and reports.

### 4.1.3 Operations

The operations staff at the DAAC primarily performs its tasks using the deployed operational components. The following tasks, however, are performed in whole or in part using M&O resources.

- ECS operations personnel supervision - provide first line supervision of ECS operations, conflict resolution, policy enforcement, time keeping, productivity monitoring, shift worker scheduling, hiring, termination, promotions, performance appraisals, salary adjustments, discipline, etc., and
- ECS operations policy - develop and administer policies, directives, and guidance to implement both ECS and DAAC operations tasking, procedures, practices, and priorities.
- ECS operations readiness - ensure elements are in a state of operational readiness at all times including launch preparations; conduct Operational Readiness Reviews and monitor M&O activities, provide visibility to DAAC, ESDIS and ECS management on operations readiness;
- ECS operations training and certification - develop and maintain center specific initial and refresher operations training and certification packages; maintain training and certification records; report on staff training; coordinate with SEO system-level training and certification requirements;
- ECS performance assurance - provide coverage of operational phase activities in PAIP (DID 501); continue the tasks of the RMA program throughout the operational phase;
- ECS production scheduling - schedule system updates and maintenance schedules; coordinate user requests.
- ECS operations coordination - exchange operations information between and among DAAC operators and with personnel at other locations.

## 4.2 Design Components

The components that comprise the EDC M&O equipment are shown in Figures 4.2-1 through 4.2-3. Additional DAAC supplied equipment is listed in Appendix A.

Tables 4.2-1 and 4.2-2 show the HW/SW mappings for the PCs and Sun equipment. Network information is shown in Table 4.2-3.

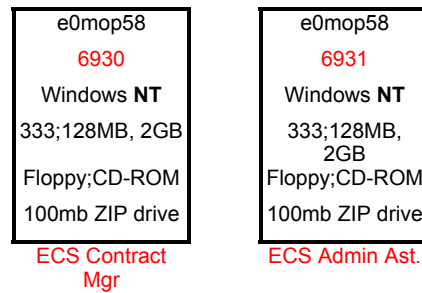
Figure 4.2-4 shows the M&O LAN network topology.

Network cabling is shown in *EDC Cable Management Plan*, 920-TDE-005.

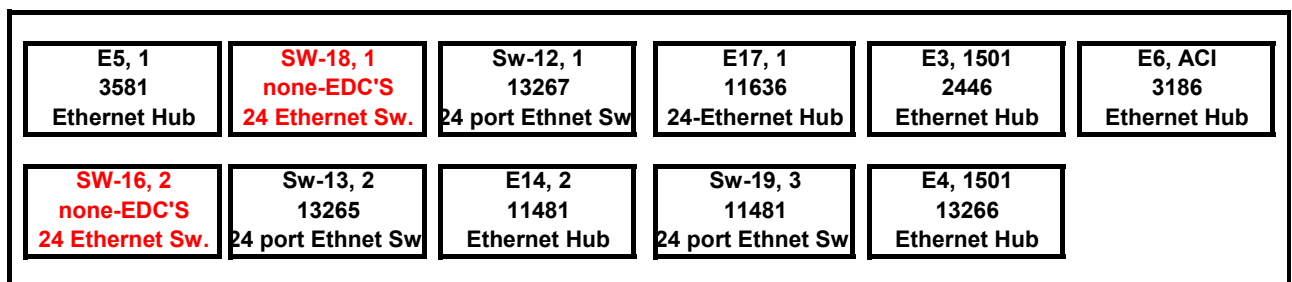
The location of the M&O equipment in the facility is under the control of the DAAC and is documented in the property management database administered by the DAAC.



Disk configurations for the M&O equipment are under the control of the DAAC administrator.



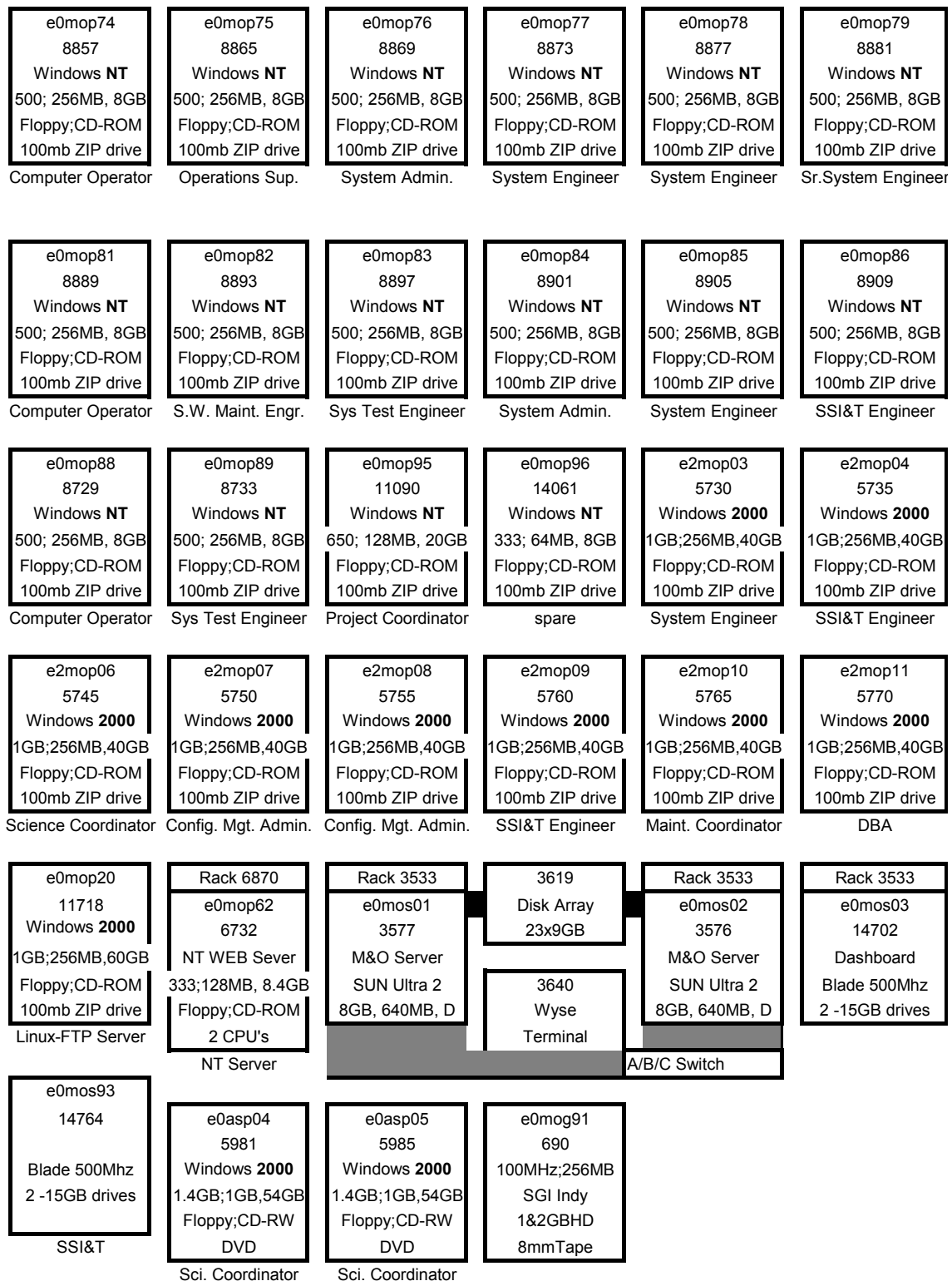
**Figure 4.2-1. EDC ECS M&O Administrative HW**



**Figure 4.2-2. EDC ECS M&O Communications HW**

e0mog91 690 IRIX	e0mop07 2316 Windows 95 200;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux	e0mos08 3634  SUN Ultra 1 6GB, 256MB System Admin.	e0mos09 3635  SUN Ultra 1 6GB, 256MB System Admin.	e0mox10 2051  X-Terminal NCD HMX Pro 16MB System Admin.	e0mox13 2350  X-Terminal NCD HMX Pro 16MB SSI&T	
e0mop18 2318 Windows 95 200;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux/Sybase			e2mop02 3587 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux	e0mop21 3599 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux security	e0mos23 14760  BLADE 500MHz 2- 15GB drives System Admin.	
e0mox24 2072  X-Terminal NCD HMX Pro 16MB System Admin.	e0mop25 3603 Windows NT 266;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mos26 14761  BLADE 500MHz 2- 15GB drives System Admin.	e0mos28 14762  BLADE 500MHz 2- 15GB drives SSI&T	e0mox30 2088  X-Terminal NCD HMX Pro 16MB spare	e0moh32 2243  HP Printer 5Si 8MB RAM HP Duplexer Printer	e0mop33 3601 Windows 95 266;64MB, 2GB <b>Scanner-6921</b> 100mb ZIP drive Visitor
e0mop35 3596 Windows NT 266;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop36 3605 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mox37 3043  X-Terminal NCD HMX Pro 16MB Operations	e0mox38 4788  X-Terminal NCD HMX Pro 16MB SSI&T	e0mox40 653  X-Terminal NCD HMX Pro 16MB SSI&T	e0mox41 4808  X-Terminal NCD HMX Pro 16MB Ops	e0mox42 4802  X-Terminal NCD HMX Pro 16MB SW. Maint. Engr
e0mox46 4806  X-Terminal NCD HMX Pro 16MB Sys. Engr.		e0mop47 6060 Windows NT 300; 96MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop48 6062 Windows 95 300; 96MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop49 6064 Windows NT 300;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Operations	e0mop50 6733 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive SSI&T Engineer	e0mop51 6924 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive ECS Contract Mgr
e0mop52 6925 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Resource Planner	e0mop53 6926 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive	e0mop54 6927 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive SSIT	e0mop55 6928 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop56 6929 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive System Engineer	e0mop57 6930 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Facility Engr.	e0mop58 6931 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive ECS Admin Ast.
e0mop59 6932 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive S.W. Maint. Engr.	e0mop60 6731 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive S.W. Maint. Engr.	e0mop61 6732 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Sys Test Engineer	e0moh69 1261  HP Printer 4 16mb ram User Services	e0mop70 8737 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive System Admin.	e0mop71 8737 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive System Engineer	e0mop72 8741 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive Maint. Coordinator

**Figure 4.2-3. EDC ECS M&O Engineering and Operations HW (1 of 2)**



**Figure 4.2-3. EDC ECS M&O Engineering and Operations HW (2 of 2)**

**Table 4.2-1. EDC ECS M&O HW/SW Mapping (1 of 2)**

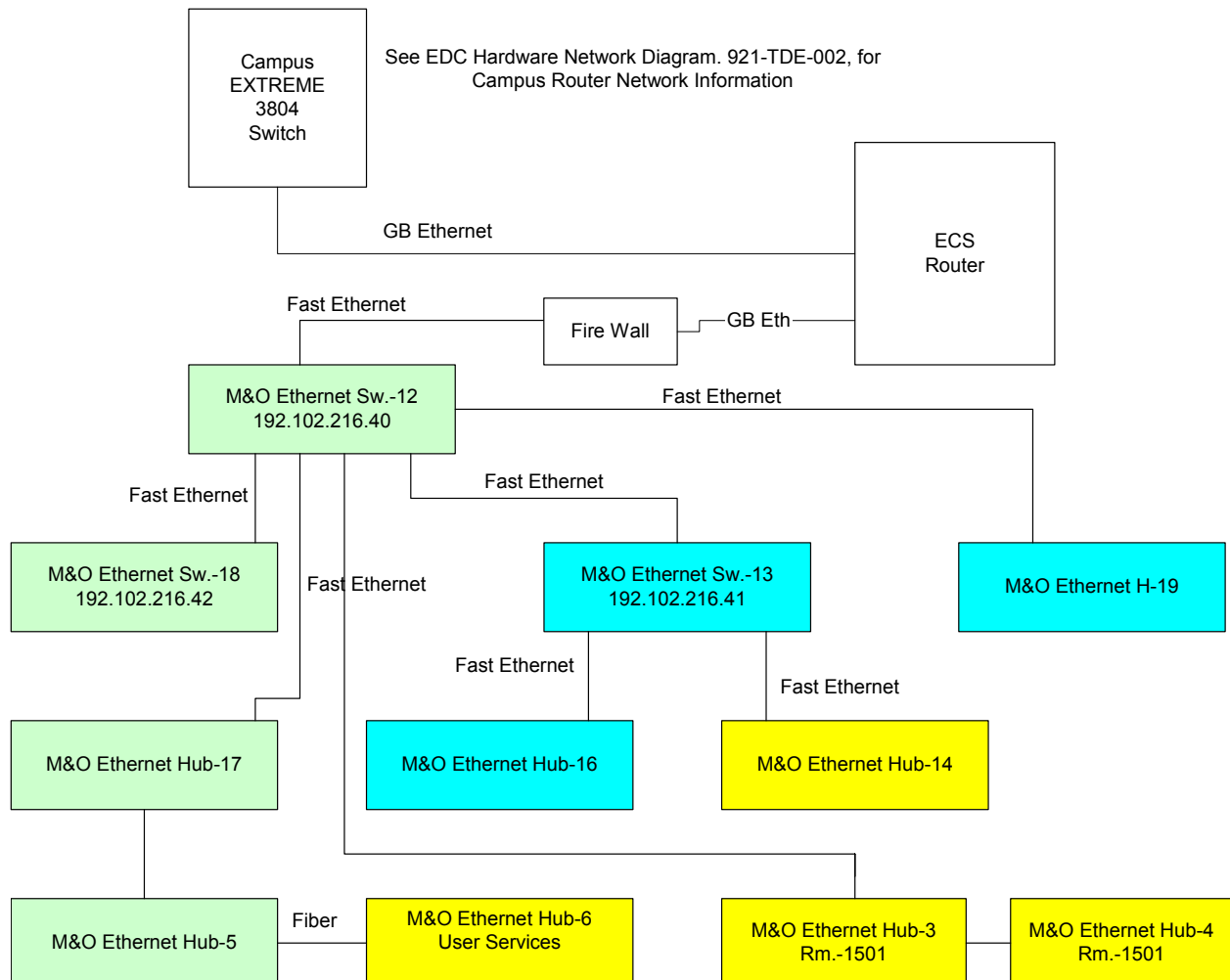
Host Name	Windows 95/Plus	Windows NT 4.0	Microsoft Office 2000	Humngbrd Exceed	Other	Acrobat Distiller
e0mop07	Linux		X		Linux	
e0mop11	X		X			
e0mop17		X	X			
e0mop18	Linux		X		Linux	
e2mop02	Linux		X		Linux	
e0mop21	Linux		X		Linux	
e0mop25		X	X			
e0mop33	X		X			
e0mop35		X	X			
e0mop47		X	X		X	
e0mop48	X		X			
e0mop49		X	X	X	Easy Cad X	
e0mop50		X	X	X		
e0mop51		X	X			
e0mop52		X	X			
e0mop53		X	X	X		
e0mop54		X	X	X		
e0mop55		X	X	X		
e0mop56		X	X			X
e0mop57		X	X	X		X
e0mop58		X	X	X		
e0mop59		X	X	X		
e0mop60		X	X	X		
e0mop61		X	X	X		
e0mop62		XX	X		NT SERVER	

**Table 4.2-1. EDC ECS M&O HW/SW Mapping (2 of 2)**

Host Name	Windows 95/Plus	Windows NT 4.0	Microsoft Office 2000	Humngbrd Exceed	Other	Acrobat Distiller
e0mop67		X	X			
e0mop70		X	X			
e0mop71		X	X			
e0mop72		X	X			
e0mop73		X	X			
e0mop74		X	X			
e0mop75		X	X			
e0mop76		X	X			
e0mop77		X	X		X	
e0mop78		X	X		X	
e0mop79		X	X	X	Easy Cad X	
e0mop80		X	X	X		
e0mop81		X	X			
e0mop82		X	X			
e0mop83		X	X	X		
e0mop84		X	X	X		
e0mop85		X	X	X		
e0mop86		X	X		Visio Prof.	
e0mop87		X	X	X		
e0mop88		X	X	X		
e0mop89		X	X	X		
e0mop95		X	X	X		X
e0mop96		X	X	X		
e2mop01	2000 SVR		X			
e0mop20	Linux		X			
e2mop03	2000		X			
e2mop04	2000		X			
e2mop05	2000		X			
e2mop06	2000		X			
e2mop07	2000		X			
e2mop08	2000		X			X
e2mop09	2000		X	X		
e2mop10	2000		X		Visio Prof.	
e2mop11		X	X	X		
e2mop14		X	X			
e2mop15		X	X			
e2mop16		X	X			

**Table 4.2-2. EDC UNIX Workstations HW/SW Map**

Host Name	Solaris	Sparc wrks	Visual Workshop C++ 3.0	Tools H++	F-Secure SSH Server	Legato Networker* Client	Sparc Compiler C++
e0mos01	8		2.0	X	X	X	X
e0mos02	8				X	X	
e0mos03	8				X	X	
e0mos08	8				X	X	
e0mos09	8				X	X	
e0mos23	8				X	X	
e0mos26	8	X			X	X	
e0mos28	8				X	X	
e0mos92	8				X	X	
e0mos93	8				X	X	



**Figure 4.2-4. EDC M&O LAN Topology**

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## 5. EDC DAAC M&O Equipment Test Results

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### 5.1 EDC DAAC Requirements Traceability

Table 5-1 shows the mapping of Section 3 requirements to EDC M&O hardware and software elements described in section 4.

**Table 5-1. EDC DAAC M&O Requirements Mapping (1 of 2)**

Requirement	Description	SW Component(s)
EDCMO0100	Number of staff	PCs: Hummingbird Exceed Windows NT Workstations/Servers: Microsoft Office 2000 Sun Solaris DCE base services for Solaris DCE for Solaris
EDCMO0110	System administration	PCs: Microsoft Office 2000 Norton Utilities 95 Workstations/Servers: Legato Networker
EDCMO0120	Management status and performance reports	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000
EDCMO0130	Management and technical reports	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000
EDCMO0140	DAAC internal coordination	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000 Workstations/Servers: z-Mail
EDCMO0150	DAAC external coordination	PCs: Windows NT Microsoft Office 2000 Workstations/Servers: z-Mail

**Table 5-1. EDC DAAC M&O Requirements Mapping (2 of 2)**

<b>Requirement</b>	<b>Description</b>	<b>SW Component(s)</b>
EDCMO0160	ECS documentation	PCs: Windows 95 or NT Microsoft Office 2000 Hummingbird Exceed
EDCMO0200	Management planning resources	PCs: Windows NT Microsoft Office 2000 Microsoft Project
EDCMO0210	Management policies and procedures	PCs: Windows NT Microsoft Office 2000
EDCMO0300	Operations data	PCs: Windows NT Microsoft Office 2000 Hummingbird Exceed
EDCMO0310	DAAC unique software	Workstations/Servers: Sparcworks Visual Workshop C++ Tools H++ DB Tools H++ Core Library Sybase CT Library Access SW Parts Manager
EDCMO0400	Operations policies and procedures	PCs: Windows NT Microsoft Office 2000

## **5.2 Test Results**

Installation of the EDC DAAC M&O Hardware occurred in 1997 and 1998. When the hardware and software was installed, each computer was initialized and the functionality of all HW, SW, and networks verified.

## Appendix A. Non-ECS Hardware

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DAAC provided hardware has been added to the ECS M&O suite. These resources are not formally part of this document but are provided for reference purposes. Figures A-1 show the additional hardware.

e0mop63 7035 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.163 Sys. Test Eng.	e0mop64 7038 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.164 Operations	e0mop65 7041 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.165 Sys Adm	e0mop66 7044 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.166 Maint. Coordinator		
e0mlp76 7070 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp77 7071 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp78 7072 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp79 7073 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp80 7032 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp81 7033 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM

**Figure A-1. EDC DAAC Supplied Operations Hardware**

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# Abbreviations and Acronyms

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CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration management
COTS	Commercial Off the Shelf
DAAC	Distributed Active Archive Center
ECS	EOSDIS Core System
EDC	EROS Data Center, Sioux Falls, SD
HW	Hardware
ILS	Integrated Logistics Support
LRU	Line Replaceable Unit
M&O	Maintenance and Operations
QA	Quality assurance
RMA	Reliability, Maintainability, Availability
SMC	System Monitoring Center
SW	Software
TT	Trouble tickets

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